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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---------------------------|-------------|----------------------|---------------------|------------------|
| 10/707,208 | 11/26/2003 | Viraj A. Patwardhan | NSC1P131X3 | 1207 |
| 22434 | 7590 | 04/11/2005 | EXAMINER | |
| BEYER WEAVER & THOMAS LLP | | | TRINH, HOA B | |
| P.O. BOX 70250 | | | ART UNIT | |
| OAKLAND, CA 94612-0250 | | | PAPER NUMBER | |

2814

DATE MAILED: 04/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/707,208 | PATWARDHAN ET AL. | |
| | Examiner | Art Unit | |
| | Vikki H. Trinh | 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 1-7, 14-20 and 22-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-13 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>01/26/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 1-6, 14-20, 22-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected Groups, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on Feb. 01, 2005.
2. Applicant's election with traverse of Group II, claims 8-13 and newly added claim 21, in the reply filed on Feb. 01, 2005 is acknowledged. The traversal is on the ground(s) that examination of all groups should be possible. This is not found persuasive because the groups are distinct and that they are not obvious variants of one another, as stated in the previous Office Action. Note that claims 22-24 are directed to a semiconductor wafer which was set forth in Group I in the previous Office Action.

The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

3. Claim 12 is objected to because of the following informalities: In claim 12, line 2, "the underlying" should be "an underlying". Appropriate correction is required.
4. Claim 21 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 13 is rejected under 35 U.S.C. 102(e) as being anticipated by Buchwalter et al. (2002/0109228 A1) (hereinafter Buchwalter).

As to claim 13, Buchwalter discloses an integrated circuit device (fig. 1H) , comprising: a die 22 (fig. 1H) having an active surface and a plurality of die contact pads 12 or 26 (fig. 1H) formed on the active surface of the die; a plurality of solder bumps 18 (fig. 1H) coupled with associated die contact pads 12 or 26 (fig. 1H); and a support coating 14 (fig. 1H) formed on said active surface of sufficiently said die, wherein said support coating 14 (fig. 1H) is rigid (page 2, col. 2, line 34) such that it is suitable for significantly constraining portions of the solder bumps near the bump to die interfaces during a subsequent reflow of said plurality of solder bumps 18 (fig. 1H).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 8-12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchwalter et al. (2002/0109228 A1) (hereinafter Buchwalter).

As to claims 8 and 21, Buchwalter discloses a integrated circuit device (fig. 1H) , comprising a die 22 (fig. 1H) having an active surface (fig. 1H), a plurality of solder bumps 18 (fig. 1H) formed on the active surface of said die; and a support coating 14 (fig. 1H) formed on said active surface of said die 22 (fig. 1H), wherein said support coating has been fully cured (page 2, col. 2, lines 34) prior to any reflow of any of said plurality of solder bumps 18 (fig. 1H). However, Buchwalter does not explicitly teach that the injunction (fig. 2C) between the solder bumps 18 (fig. 2C) and their associated surfaces of formation define wetting angles that are at least approximately 40 degrees (fig. 2c). Nevertheless, it would have been obvious to one skilled in the art at the time the invention was made to modify the position of the bumps such that the wetting angles is about 40 degrees, since it is a prima facie obvious to an artisan for optimization and experimentation to claim a wetting angle of 40 degrees because applicant has not yet established any criticality for the specific angle.

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based

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upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

As to claim 9, the support coating 14 (fig. 1H) is formed from an epoxy based material (page 2, col. 2, line 46).

As to claims 10-11, Buchwalter does not explicitly state a range for the height of the support coating 14 (fig. 2C) relative to the bumps 18 (fig. 2C). Nonetheless, it would have been obvious to one of ordinary skills in the art at the time the invention was made to construct the support coating having a range of height relative to the bumps, since it is a prima facie obvious to an artisan for optimization and experimentation with a specific range for the height of the support coating relative to the bumps because applicant has not established any criticality for the specific range.

As to claim 12, the support coating is applied over the active surface and the underlying pads, under bump metallization (fig. 1H).

Conclusion

References (6228678) and (6346296) each discloses an IC having a substrate, pads, bumps and support coating. (see entire documents)

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

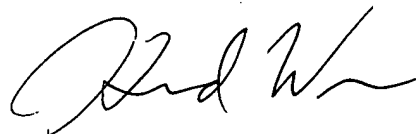
Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests

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to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

Vikki Trinh,
Patent Examiner
AU 2814

A handwritten signature in black ink, appearing to read "Howard Weiss", is positioned above the printed name.

**HOWARD WEISS
PRIMARY EXAMINER**